

the danger-line at Saint Louis, Mo., and rose slowly at that point until the 8-9th, when it was 1.1 foot above the danger-line. On the 6th the Mississippi River fell below the danger-line at La Crosse, Wis., Davenport, Iowa, and Arkansas City, Ark. Floods were reported in streams in western Illinois. Tracks of the Illinois Central Railroad were flooded near New Orleans, La.

On the 9th water from Lake Pontchartrain flooded the rear portion of New Orleans. On the 10th the Warrior River in Alabama was rising rapidly. On the 10th and 11th damage was caused by flood along the Warrior and Tombigbee rivers. On the 12th the Mississippi River fell below the danger-line at Hannibal, Mo. Great damage was caused about Columbus, Miss., by high water in the Tombigbee River. On the 13th the Mississippi River fell below the danger-line at Keokuk, Iowa. Low lands about Nebraska City, Nebr., were flooded by a rise in the Missouri River. Floods continued along the Warrior and Tombigbee rivers, causing great destitution, and immense damage to the corn and cotton crops.

On the 15th the Mississippi River fell below the danger-line at Saint Louis, Mo. The Coosa River overflowed its banks at Gadsden, Ala., and the Alabama River was rising rapidly. On the 20th the Pearl River was reported the highest ever known at Jackson, Miss.; great loss of stock and crops was reported in swamp lands. On the 24th the Mississippi River fell below the danger-line at Helena, Ark., and Vicksburg, Miss. At the close of the month the rivers were below the danger-line, except at New Orleans, La., where it continued above the danger-line until August 4th.

STAGE OF WATER IN RIVERS.

The following table shows the danger-points at the various river stations; the highest and lowest stages for the month, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, July, 1892 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>						
Shreveport, La.	29.9	21.6	1	6.0	31	15.6
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	8.1	7	3.0	31	5.1
Little Rock, Ark.	23.0	11.5	10	8.5	28	3.0
<i>Missouri River.</i>						
Fort Buford, N. Dak.		18.8	5	11.3	31	7.5
Bismarck, N. Dak.		14.7	7	6.8	31	7.9
Pierre, S. Dak.	14.0	9.3	9	3.9	31	5.4
Sioux City, Iowa.	18.7	15.9	12	11.1	31	4.8
Omaha, Nebr.	18.0	15.3	3, 14	11.1	31	4.2
Kansas City, Mo.	21.0	19.8	5	14.0	31	5.8
<i>Mississippi River.</i>						
Saint Paul, Minn.	14.0	8.4	1	4.5	17, 18	3.9
La Crosse, Wis.	11.8	10.6	1, 3	5.1	26	5.5
Dubuque, Iowa.	16.0	16.4	1	6.7	31	9.7
Davenport, Iowa.	15.0	16.7	1	5.4	28-31	11.3
Keokuk, Iowa.	14.0	19.0	1	6.3	31	12.7
Hannibal, Mo.	17.0	20.8	3	8.0	31	12.8
Saint Louis, Mo.	30.0	31.1	8, 9	19.0	31	12.1
Cairo, Ill.	40.0	36.2	13, 14	21.3	31	14.9
Memphis, Tenn.	33.0	28.8	17	18.5	31	10.3
Vicksburg, Miss.	41.0	46.4	1	37.7	31	8.7
New Orleans, La.	13.0	16.1	1	13.5	31	2.6
<i>Ohio River.</i>						
Parkersburg, W. Va.	38.0	9.9	7	4.3	23, 28	5.6
Cincinnati, Ohio.	45.0	15.2	8	8.0	29, 30	7.2
Louisville, Ky.	24.0	7.7	7	4.9	31	2.8
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	7.1	12	2.7	31	4.4
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	12.4	7	3.8	31	8.6
<i>Monongahela River.</i>						
Pittsburg, Pa.	29.0	7.8	6	2.7	11	5.1
<i>Savannah River.</i>						
Augusta, Ga.	32.0	24.7	12	7.7	31	17.0
<i>Willamette River.</i>						
Portland, Oregon.	15.0	18.5	4	8.5	31	10.0
<i>Susquehanna River.</i>						
Harrisburg, Pa.	17.0	4.7	1	1.4	30	3.3
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	20.4	16	2.8	6	17.6

ATMOSPHERIC ELECTRICITY.

THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

Thunderstorms were reported as follows: East of the Rocky Mountains they were reported in the greatest number of states, 34, on the 22d; in 33 on the 13th and 26th; in 32 on the 25th and 29th; in 31 on the 3d and 27th; in 20 to 30 on the 1st, 2d, 9th to 12th, 14th, 15th, 16th, 18th to 21st, 23d, 24th, 28th, 30th, and 31st; and in 10 to 19 on the 4th to 8th, and 17th.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 31, in Florida and Mississippi; on 20 to 30 in Alabama, Arkansas, Georgia, Illinois, Iowa, Kansas, Kentucky, Louisiana, Michigan, Missouri, Nebraska, New York, North Carolina, North Dakota, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Virginia, West Virginia, and Wisconsin; on 10 to 19 in Colorado, Indiana, Maine, Maryland, Massachusetts, Minnesota, Montana, New Hampshire, Ohio, Rhode Island, and Vermont; and on 9 in the District of Columbia and Indian Territory.

West of the Rocky Mountains thunderstorms were reported in Arizona on the 1st to 6th, 9th to 26th, 30th, and 31st; in California on the 3d, 4th, 5th, 26th, and 27th; in Colorado on the 1st, 6th to 19th, and 21st to 30th; in Idaho on the 28th; in Nevada on the 4th, 5th, 7th to 10th, 12th, 13th, 27th, and 28th; in New Mexico on the 1st, 4th to 18th, and 20th to 31st; in Utah on the 5th to 10th, 16th, 19th, and 27th to 31st; in Washington on the 3d, 4th, 6th, 11th, 14th, 15th, 19th, and 22d; and in Wyoming on the 1st, 2d, 3d, 6th to 9th, 21st, 27th, 28th, and 29th.

AURORAS.

Exceptionally brilliant auroral displays over unusually ex-

tensive areas of visibility, for the season, were a feature of the month, the display of the night of the 16th, which was observed from Maine to Montana, and southward to North Carolina and Missouri, being one of the most remarkable ever noted during the summer months.

Auroral displays of July, 1892.

Date.	Station.	Extent of display.		Remarks.
		Azimuth.	Altitude.	
13-14	Buffalo, N. Y.	115 to 255	0	25 Arch of diffused white, with flashes of light to zenith.
13	Oswego, N. Y. ....	.....	40	Arch, with "merry dancers."
13	Chicago, Ill.	Cov'd 160	40	Diffused white light.
13-14	Alpena, Mich. ....	.....	.....	Arch of white light, with beams nearly to zenith.
13-14	Cheboygan, Mich.	135 to 215	45	Arch and brilliant streamers of purple and orange to zenith.
13	Detroit, Mich. ....	.....	70	Bright white arch formed, with streamers to zenith.
13	Grand Haven, Mich. ....	.....	15	Arch of white light, with "merry dancers" to zenith.
13	Marquette, Mich.	90 to 270	Zenith	In morning, wavy vertical folds of flashing light.
13	Marquette, Mich.	135 to 225	30	At night, irregular arch, with streamers.
13	Sault Ste. Marie, Mich.	180 to 270	30	Yellow and bluish light, with streamers.
13	La Crosse, Wis.	In north.	45	Arch of white light, with "merry dancers."
13	Milwaukee, Wis. ....	.....	.....	Bands, curtains, and streamers to zenith, with rapid movement from southeast to northwest.
13	Des Moines, Iowa.	Cov'd 45	15	Pale gray diffused light, with one streamer in northwest.
13	Hannibal, Mo.	90 to 270	90	Arch of white light, with beams in north.
13	Yankton, S. Dak.	140 to 230	20	Two arches, with light moving from west to east.
13	Miles City, Mont. ....	.....	75	Column of rose color in southeast, moved slowly to northwest, and there formed an arch.
14	Spokane, Wash. ....	.....	20	Faint arch, with vertical beams in early morning.

Auroral displays of July, 1892—Continued.

Date.	Station.	Extent of display.		Remarks.
		Azimuth.	Altitude.	
16	Eastport, Me.....	.....	To s. of zenith.	Brilliant flashes of white light, with pink and violet tints in north.
16	Portland, Me.....	Cov'd sky.	.....	Very brilliant red in west, green in east, and white in south.
16	Manchester, N. H.....	.....	Zenith	Brilliant red in northwest, extended and changed to pink, yellow, and green.
16	Boston, Mass.....	90 to 270	35 s. of zenith.	Yellow arch formed south of zenith, light changed to green and dark red.
16	Woods Holl, Mass.....	100 to 260	80	Narrow band of white light.
16	Block Island, R. I.....	.....	.....	Bright beams, with motion from west to east.
16	Narragansett Pier, R. I.....	In north.	.....	White arch, with beams to zenith.
16	New Haven, Conn.....	.....	Zenith	Pale green and white streamers in north; arch formed, crossing the zenith.
16-17	Buffalo, N. Y.....	In north.	Zenith	Arch to zenith, with "merry dancers."
16	Ithaca, N. Y.....	140 to 220	8	Low arch. Northern sky a blaze of red light, flashing to zenith.
16	Oswego, N. Y.....	.....	30	Double arch, with waves of pink light to within 20° of southern horizon.
16	Rochester, N. Y.....	45 to 110	Zenith	Three bands of light, changing from pink to green.
16	Wedgwood, N. Y.....	95 to 275	30 s. of zenith.	Diffused rosy light.
16	Atlantic City, N. J.....	130 to 255	25	Sheets and streaks of light of steel blue, purple, and red.
16	Bridgeton, N. J.....	135 to 225	.....	White light, with "merry dancers."
16	Erie, Pa.....	90 to 270	45	Straw-colored light, with flashes of light to 60°.
16	Harrisburg, Pa.....	In north.	.....	Beams and flashes of light to zenith.
16	Phoenixville, Pa.....	.....	.....	Streamers, waves, and bands, with movement from east to north-west; colors crimson, green, and gray.
16	Philadelphia, Pa.....	In north.	.....	Billows and beams of straw, green, and pale red colors almost to zenith.
16	Pittsburg, Pa.....	115 to 200	20	Beams, scarlet, green, and yellow.
16	Baltimore, Md.....	130 to 190	25	An arch, with flashes of red light.
16	Washington, D. C.....	Cov'd 90	20	Rainbow-like arch, with occasional streamers.
16	Big Stone Gap, Va.....	In north.	.....	Light red sheet, with white bands.
16	Louisburg, N. C.....	In north.	.....	White, rose, and orange, fading into gray.
16	Cincinnati, Ohio.....	.....	60	Arch, with beams. Deep red, changing to yellow and green.
16	Cleveland, Ohio.....	Cov'd 180	Zenith	Arch, with white bands.
16	Grand Rapids, Ohio.....	In north.	45	Arch, with white light.
16	Chicago, Ill.....	120 to 165	15	Arch.
16	Evansville, Ill.....	140 to 220	15	Arch, with flashes of light.
16	Alpena, Mich.....	.....	.....	Sky nearly covered with colored lights.
16-17	Cheboygan, Mich.....	135 to 195	70	Colored streamers.

Auroral displays of July, 1892—Continued.

Date.	Station.	Extent of display.		Remarks.
		Azimuth.	Altitude.	
16	Detroit, Mich.....	90 to 270	70	Beams of green, pink, and white, with movement from e. to w.
16	Grand Haven, Mich.....	90 to 270	10	Incomplete corona formed in zenith.
16	Manistee, Mich.....	60 to 170	70	Two arches, with beams to zenith, and pillars of light.
16-17	Marquette, Mich.....	90 to 270	25	Corona formed in zenith, with streamers of various colors.
16-17	Port Huron, Mich.....	In north.	.....	Bright beams of yellow and green to zenith.
16	Sault Ste. Marie, Mich.....	.....	.....	Sky covered with waves of colored light, "merry dancers." Telegraph instruments burned out.
16	La Crosse, Wis.....	100 to 255	40	An arch over a curtain-like appearance, with "merry dancers" to zenith.
16	Milwaukee, Wis.....	In n. & ne.	75	Immense fan-shaped light, with streamers. An arch formed, with waves of light.
16	Duluth, Minn.....	Cov'd 160	Zenith	Beams and waves of diffused light to zenith.
16	Moorhead, Minn.....	.....	Zenith	A cone-shaped formation, presenting prismatic colors, extended to zenith, and shot out shafts of light nearly to horizon.
16	Red Wing, Minn.....	.....	20	An arch, with "merry dancers."
16	Saint Vincent, Minn.....	.....	45	Streamers of rosy red.
16	Davenport, Iowa.....	155 to 220	60	Arch, with pale yellow and rosy red colors.
16	Des Moines, Iowa.....	.....	15	Arch, with brilliant streamers of green, orange, and purple.
16	Dubuque, Iowa.....	.....	35	Flashes and slender beams of light, followed by arch.
16	Keokuk, Iowa.....	150 to 230	75	Arch, changing in color from white to red and green.
16-17	Kansas City, Mo.....	145 to 225	18	Bright white light, with slender beams.
16-17	Bismarck, N. Dak.....	170 to 250	30	Irregular pale beams shot upward and from east to west, and formed corona in zenith.
16	Fort Buford, N. Dak.....	180 to 225	.....	Diffused light formed into an arch.
16	Huron, S. Dak.....	.....	Nearly to zenith.	Beams of light in north and north-east.
16	Yankton, S. Dak.....	150 to 220	20	Arch, with pale beams of light.
16	Omaha, Nebr.....	In north.	20	Arch, with red and white streamers.
16	Miles City, Mont.....	.....	35	Arch of pale blue, with "merry dancers."
20	Manchester, N. H.....	135 to 215	70	Rays of pink, yellow, and green.
20	Oswego, N. Y.....	In north.	35	Faint arch of whitish color.
20	Erie, Pa.....	Cov'd 135	45	Arch.
20	Sault Ste. Marie, Mich.....	180 to 270	80	Green colored arch, with flashing beams of light.
20	Bismarck, N. Dak.....	160 to 250	30	Arch.
24	Oswego, N. Y.....	90 to 225	40	Arch, with streamers.
25	Alpena, Mich.....	135 to 270	15	Arch, with rose-colored beams.
25	Saint Paul, Minn.....	.....	40	Pale light, with purple beams.
25	Omaha, Nebr.....	160 to 230	40	Arch, with beams of light.
28	Saint Paul, Minn.....	160 to 200	35	Pale light, with numerous slender beams.

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for July, 1892, of the directors of the various state weather services:

ALABAMA.

Temperature.—The mean was 1.7 below the normal; maximum, 98, at Brewton and Daphne, 30th; minimum, 60, at Healing Springs, 21st; greatest monthly range, 36, at Healing Springs; least monthly range, 20, at Citronelle.

Precipitation.—The average was 4.29 above the normal; greatest monthly, 14.43, at Mobile; least monthly, 3.38, at Bermuda.—*P. H. Mell, Observer, Weather Bureau, Auburn, director.*

ARIZONA.

Temperature.—Maximum, 118, at Fort Mohave, 1st; minimum, 44, at Holbrook, 3d and 4th; greatest monthly range, 56, at Reymert; least monthly range, 27, at Dos Cabezas.

Precipitation.—Greatest monthly, 6.15, at Payson; least monthly, 0.00, at Red Rock, Fort Mohave, Rancho del Pueblo, and Yuma.

Wind.—Prevailing direction, southwest.—*J. C. Hayden, Observer, Weather Bureau, Tucson, director.*

ARKANSAS.

Temperature.—The mean was 1.5 below the normal; maximum, 104, at Keesees Ferry, 20th and 21st; minimum, 52, at Fayetteville, 4th; greatest monthly range, 44, at Rogers; least monthly range, 24, at Greenville, Miss.

Precipitation.—The average was 0.09 below the normal; greatest monthly, 9.25, at Greenville, Miss.; least monthly, 1.09, at Madding.

Wind.—Prevailing direction, south.—*M. F. Locke, Commissioner of Agriculture, Little Rock, director; F. H. Clarke, Observer, Weather Bureau, assistant.*

CALIFORNIA.

Temperature.—Maximum, 114, at Lagrange, 31st; minimum, 34, at Yreka, 11th; greatest monthly range, 68, at San Ardo; least monthly range, 35, at Sweetwater Dam.

Precipitation.—Greatest monthly, 0.67, at Crescent City; least monthly, 0.00, at a number of places.

Wind.—Prevailing direction, west.—*J. A. Barwick, Observer, Weather Bureau, Sacramento, director.*

COLORADO.

Temperature.—The mean was normal; maximum, 109, at Orchard, 21st; minimum, 22, at Breckenridge, 2d; greatest monthly range, 66, at Orchard; least monthly range, 42, at Como, Georgetown, and Livermore.

Wind.—Prevailing direction, west.—*W. S. Miller, Observer, Weather Bureau, Denver, director.*

FLORIDA.

Temperature.—Maximum, 100, at Mullet Key, 4th, 15th, 24th, and 25th; minimum, 65, at Archer, 2d, 4th, 5th, and 6th; greatest monthly range, 32, at Archer; least monthly range, 16, at Merritts Island.